Science at Church Eaton

Intent: What are our aims?

Our entire curriculum is designed to educate and form the whole child. We want children to have a deep understanding of their own story – to know where they have come from, what their own aspirations for the future are and what skills they will need to achieve them. We want children to leave Church Eaton understanding that:

- They are part of a small rural community with a very long and very proud history. (**Community)**
- They are also part of an enormous diverse wider world that will provide endless opportunities. **(Diversity)**
- They are equipped with a toolkit of skills which they can, regardless of their starting points, use to succeed and be the best that they can be **(Social Mobility).**

The Science scheme of work supports these guiding principles and aims to help pupils develop a sense of excitement and curiosity about natural phenomena and an understanding of how the scientific community contributes to our past, present and future. We want pupils to develop a complex knowledge of Biology, Chemistry and Physics, but also adopt a broad range of skills in working scientifically and beyond. The scheme of work is inclusive and meaningful, so all pupils may experience the joy of science and make associations between their science learning and their lives outside the classroom. Studying science allows children to appreciate how new knowledge and skills can be fundamental to solving arising global challenges.

Our Science curriculum is ambitious, broad and balanced for all pupils. It is designed and sequenced so that pupils build knowledge and skills cumulatively over time and apply them confidently in a range of contexts. The curriculum is adapted, where appropriate, so that disadvantaged pupils, pupils with SEND, pupils known to social care and those facing other barriers to learning can access the same ambitious curriculum and thrive. Our curriculum encourages critical thinking and empowers pupils to question the how's and whys of the world around them.

Our scheme encourages:

- A strong focus on developing knowledge *alongside* scientific skills across Biology, Chemistry and Physics.
- Curiosity and excitement about familiar and unknown observations.
- Challenging misconceptions and demystifying truths.
- Continuous progression by building on practical and investigative skills across all units.
- Critical thinking, with the ability to ask perceptive questions and explain and analyse evidence.
- Development of scientific literacy using wide-ranging, specialist vocabulary.

Our Science scheme of work enables pupils to meet the end of key stage attainment targets in the National Curriculum, and the aims also align with those set out in the National curriculum.

Implementation: What do we teach?

To meet the aims of the National curriculum for Science and in response to the Ofsted Research review into Science, we have identified the following key strands:

- **Scientific knowledge and understanding** of:
  - Biology - living organisms and vital processes.
  - Chemistry - matter and its properties.
  - Physics - how the world we live in 'works.
- **Working scientifically** - processes and methods of science to answer questions about the world around us.
- **Science in action** - uses and implications of science in the past, present and for the future.

We follow a spiral curriculum model where previous skills and knowledge are revisited, remembered and built upon. Learning is carefully sequenced so that pupils develop increasingly secure scientific knowledge, conceptual understanding and enquiry skills over time.

Each unit is based upon one of the key science disciplines; Biology, Chemistry and Physics and to show progression throughout the school we have grouped the National curriculum content into six key areas of science:

1. **Plants**
2. **Animals, including humans**
3. **Living things and habitats**
4. **Materials**
5. **Energy**
6. **Forces, Earth and space.**

Pupils explore knowledge and conceptual understanding through engaging activities and the explicit teaching of specialist vocabulary. Working scientifically is integrated with conceptual understanding rather than taught discretely, so pupils learn how scientific ideas are developed, tested and applied. This provides frequent and purposeful opportunities to develop scientific enquiry skills, carry out practical work and undertake full investigations.

Each class also follows a "Making Connections" unit that draws together prior knowledge and skills, deepens understanding and provides an additional opportunity for pupils to apply what they know. Science also contributes to strong foundations in communication and language, reading, writing and mathematics by teaching precise scientific vocabulary, encouraging discussion and explanation, requiring clear written conclusions and applying mathematical thinking through measurement, data handling and analysis.

Implementation: How do we ensure that knowledge and skills are progressive?

Nursery: Children will be taught how to

Understanding the World (The Natural world)	• Explore how things work. • Plant seeds and care for growing plants. • Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things. • Explore and talk about different forces they can feel. • Talk about the differences between materials and changes they notice

Reception to Year 6

- Our National Curriculum mapping document shows which of our units cover each of the national curriculum attainment targets as well as each of these strands within it. (See Website)
- Our Progression of skills and knowledge shows the skills that are taught within each year group and how these skills develop year on year to ensure attainment targets are securely met by the end of each key stage. (See Website)

Implementation: What units do we cover and when do we cover them?

Because we have mixed aged classes, we operate a two-year cycle for Science. Units are mapped out with the links to our Curriculum drivers of Community, Diversity (D) and Social Mobility (M) as indicated below. The precise knowledge and skills that are taught in each unit are indicated in our Progressive Knowledge and Skills Documents and the national Curriculum mapping document that is on the Curriculum section of our website. Please note: The order in which the units are completed may be altered if necessary.

	Block 1			Block 2			Block 3			Block 4			Block 5			Block 6		
EYFS	Changing materials			Seasons			Growing plants			Life Cycles			Growing plants			Choosing Materials		
	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M
Years 1/2 Cycle A	Introduction to Plants			Seasonal Changes			Habitats			Life Cycles and Health			Plant Growth			Making Connections		
	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M
Years 1/2 Cycle B	Sensitive Bodies			Everyday Materials			Comparing animals			Uses of everyday materials			Micro habits			Making connections		
	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M
Years 3/4 Cycle A	Light and Shadows			Movement and Nutrition			Materials, rocks and soils			Digestion and food			Electricity and circuits			Making Connections		
	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M
Years 3/4 Cycle B	Forces and magnets			States of matter			Sound and vibration			Classification and changing habits			Plant reproduction			Making connections		
	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M

Years 5/6 Cycle A	Materials: mixtures and Separation			Properties and Changes			Earth and Space			Circulation and health			Light and Reflection			Making Connections		
	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M
Years 5/6 Cycle B	Life Cycles and Reproduction			Unbalanced Forces			Classifying big and small			Circuits, batteries and switches			Evolution and Inheritance			Human Timeline Making connections		
	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M	C	D	M

Implementation: What do Science lessons look like?

We have identified a series of Teaching and Learning Pillars which underpin all teaching and learning at Church Eaton. Teaching is informed by evidence about how pupils learn so that lessons focus on the most important knowledge, vocabulary and concepts, present new learning clearly, revisit prior content, check understanding systematically and adapt teaching in response to misconceptions and gaps.

Pillar	
Focused Planning	Curriculum programmes of study are developed into medium term plans which highlight learning objectives, assessment opportunities and sticky knowledge objectives designed to help pupils remember long term content. Teachers then plan and tailor units of work based around big questions that need answering. These units of work integrate technology, opportunities for discussion and creativity to address the specific individual needs of pupils so that all pupils can reach their full potential regardless of their starting point. Knowledge organisers for each unit support pupils by providing a highly visual record of the key knowledge and techniques learned, encouraging recall of skills processes, key facts, and vocabulary.
Quality First Teaching	In each lesson, various teaching strategies from independent tasks to paired and group work are incorporated. This can, include practical hands-on, computer-based, and collaborative tasks. This variety means that lessons are engaging and appeal to those with a variety of learning styles. Knowledge organisers for each unit support pupils in building a foundation of factual knowledge by encouraging recall of key facts and vocabulary. Lessons are always practical in nature and encourage experimental and exploratory learning with pupils using books to document their ideas. Knowledge organisers for each unit support pupils in building a foundation of factual knowledge by encouraging recall of key facts and vocabulary. Quality First Teaching is achieved In Science by ensuring we have • High expectations for all pupils • Well-structured lessons with clear objectives • Adapted instruction to meet diverse needs • Use of formative assessment to inform teaching

	• A focus on engagement, challenge, and progress We use the 'What a lesson looks like at Church Eaton' document to ensure that quality first teaching is achieved in all Science lessons
Effective Target Setting through Meaningful Assessment	Assessment is an integral part of teaching and learning in Science. Teachers use ongoing assessment within lessons to check pupils' understanding against the learning objectives and intended knowledge and skills. This assessment is then used diagnostically to identify misconceptions, gaps in knowledge and the next steps in learning. Information from assessment supports future planning, adaptation and intervention, ensuring that all pupils are appropriately supported and challenged. Summative records are then used by teachers and subject leaders to monitor patterns in attainment and progression over time.
Targeted Support	Staff Solution Circles are used to support data analysis and identify what support children will need and how this can be achieved. This is supported by Raising Achievement and Progress Meetings that are held regularly. Adaptive teaching, appropriate scaffolds and reasonable adjustments are used in every lesson so that all pupils, including disadvantaged pupils and pupils with SEND, can access the same ambitious curriculum. Opportunities to stretch learning and deepen thinking are provided when required.
Purposeful Learning Environment	Science is celebrated with displays in and out of the classroom, and on social media. Learning resources and visual prompts are easily accessible to enable children to work independently, and shared displays are used to celebrate final products and parent engagement days. Regular access to alternative learning spaces e.g., library, hall, outside to enhance the learning experience is also explored
Extended Curriculum	Children are given the opportunity to attend a Science Club in after school club.
Reading at the core	Children are provided with reading resources at an appropriate level to support their learning. They are provided with opportunities to borrow books on Science from the school library and library bus to supplement their knowledge and interest. Technical vocabulary, speaking and listening, reading and precise written explanation are developed within Science so that pupils can articulate their understanding clearly.

Impact: What will our children have learnt from our Science Curriculum?

Through our carefully planned and sequenced curriculum we work to develop learners, from their individual starting points who are: ·

Community Builders who are aware that they are part of a small rural community with a very long and proud history and can use this sense of community spirit to work collaboratively with others for the common good. ·

Clear Communicators who are literate and numerate in all contexts and aware that they are part of an enormous diverse wider world that will provide endless opportunities for them to apply these skills. ·

Successful learners who are equipped with a toolkit of skills which they can, regardless of their starting points, use to succeed and be the best that they can be (social mobility).

The expected impact of following our Science scheme of work is that children will:

- Develop a body of foundational knowledge for the Biology topics in the National curriculum: Plants; Animals, Including Humans; Living Things and Their Habitats; Evolution and Inheritance.
- Develop a body of foundational knowledge for the Chemistry topics in the National curriculum: Everyday Materials; Uses of Everyday Materials; Properties and Changes of Materials; States of Matter; Rocks.
- Develop a body of foundational knowledge for the Physics topics in the National curriculum: Seasonal Changes; Forces and Magnets; Sound; Light; Electricity; Earth and Space.
- Be able to evaluate and identify the methods that 'real world' scientists use to develop and answer scientific questions.
- Identify and use equipment effectively to accurately gather, measure and record data.
- Be able to display and convey data in a variety of ways, including graphs.
- Analyse data to identify, classify, group, and find patterns.
- Use evidence to formulate explanations and conclusions.
- Demonstrate scientific literacy through presenting concepts and communicating ideas using scientific vocabulary.
- Understand the importance of resilience and a growth mindset, particularly in reference to scientific enquiry.
- Meet the end of key stage expectations outlined in the National curriculum for Science.

Impact: How do we track progress?

EYFS: Assessment in the EYFS takes the form of observation, and this involves the teacher and other adults as appropriate. These observations are recorded in a variety of forms in the children's Cornerstones accounts, floor books or their exercise books. Each child's progress is assessed whether they are working below age related expectations, working within age related expectations, or working above age related expectations. At the end of EYFS (Reception) Children will be assessed using the Early Learning Goals. They will either be emerging at the goal or achieved it.

Years 1–6: The impact of our scheme is monitored through both formative and summative assessment. At the start of each unit, pupils complete a knowledge catcher to help teachers identify prior knowledge and establish a baseline for learning. In each lesson, teachers use assessment guidance to check pupils' understanding against the learning objectives. This assessment is then used diagnostically to identify misconceptions, gaps in knowledge and the next steps in learning. At the end of each unit, pupils complete a unit quiz to assess what they know and remember from the learning journey. Pupils also complete endpoint assessment tasks, including Making Connections activities, called 'My Time to Shine' which provide opportunities to apply and showcase the full range of knowledge and skills from across the unit while helping teachers assess how securely pupils have understood and applied their learning. To support this further, we also carry out book looks, pupil interviews and regular moderation exercises to check the progress made and identify how best to support pupils moving forward.